THESIS

PLAN B

THE BEAN SUBSECTOR IN MALAWI: HISTORICAL DEVELOPMENTS, CURRENT STATUS, AND POLICY ISSUES

By

Patrick Sawasawa Kambewa

A PLAN B

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF SCIENCE

Department of Agricultural Economics

1997

THIS COPY MISSING PAGES
72 → 87 (end).

Requested good copy from author 12/98
Never supplied.

ABSTRACT

THE BEAN SUBSECTOR IN MALAWI: HISTORICAL DEVELOPMENTS, CURRENT STATUS, AND POLICY ISSUES

By

Patrick S. Kambewa

Legumes are a major important source of protein in Malawi where animal protein is scarce and expensive. Among the legumes, beans are a major crop. A subsector study was conducted to examine the vertical set of activities from production, through distribution to consumption. The study revealed that generally smallholder farmers do not use inputs such as fertilizer or pesticides unlike in other crops, the Government does not provide credit for the inputs in beans. The majority of the farmers face seed shortage as a major constraint. While beans are generally grown for consumption and for sale, farmers differ the extent to which they rely on beans for sale. Generally, farmers in the areas without any lucrative crop and near urban areas will rely on beans as a major cash crop. The majority of the consumers rely on the market for getting beans. What influences marketing forces is poorly understood as not much research has been conducted to understand consumer behavior.

Whereas earlier research was less market driven and concentrated on selecting on high performing lines, in recent years, there is an attempt to understand the market forces driving the seed sub-sector as well as understanding the farmers' seed technology issues. Central in these efforts will be to understand the role of institutions in improving the performance of the sub-sector.

ACKNOWLEDGMENTS

I would like to sincerely thank my major professor, Dr. Richard Bernsten for his patience in guiding me both in undertaking this study as well as my course work. Also, I acknowledge the guidance and support of other members of my committee who comprised Dr. Anne Ferguson, Dr. James Shaffer and Dr. Thomas Reardon for guiding me through this work. Also, in course of writing this thesis, I benefitted much from fellow students in the Agricultural Economics Department through their various computer skills. Mainly these skills ranged from word processing, data graphic analysis and geographical information systems analysis.

I would like to that the Bean/Cowpea CRSP (a USAID funded project) without whose financial support this work would not be possible. Also, the Bean/Cowpea CRSP provided me with much of the data and the documents which were vital for the study. I would like to express my appreciation the assistance from the Famine and Early Warning Systems (FEWS) Malawi office and the Ministry of Agriculture and Livestock Development (Malawi Government) for providing me with some of the data used in this work. Specifically, the FEWS provided me with the base maps used in this study for geographic analysis of bean production.

I thank my wife, Beauty, who has had the sole burden of raising our three children in Malawi, while I was pursuing this degree at Michigan State University in the United States of America. I thank her for the sacrifice. Last but not least, I thank my family and friends who have been supporting me during the time I was in school especially those that have taken the burden of helping wife and children.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

1.1 Problem Setting

Malawi is one of the poorest countries in the world with an annual per capita GDP of US$240 in 1991 (World Bank 1993). Since most of the population (85%) lives in the rural areas, where 90% are engaged in farming (World Bank 1993), agriculture is the mainstay for the majority of the country's population.

However, due to limited access to new agricultural technology and off-farm employment opportunities in rural areas, most smallholders barely meet their food needs and earn only limited cash income from either farming or off-farm employment. As a result, about 55% of Malawi's population live below the poverty line (World Bank 1993). Since the poor have difficulty producing enough food and do not earn sufficient funds with which to buy adequate food to meet their households' basic nutritional requirements, a significant proportion of the population is food insecure. Indicators of food insecurity include incidents of households depleting their own food stocks prior to harvest and widespread malnutrition among certain segments of the population (Mkandawire et al. 1990).

Due to widespread food insecurity, much of the population does not consume enough calories, protein and vitamins to meet their minimal nutritional requirements (Center for Social Research 1988). Among children aged 24-59 months, stunting is estimated at 61%, compared to an average of 39% for the overall Sub-Saharan region (World Bank 1993). Furthermore, the World Bank (1993) reported that stunting is higher in Malawi than in any other country in Africa for which data are available, except Burkina Faso.

Several factors contribute to the problem of protein deficiency among the poor. First, while animals are an important source of protein in many African countries, animal protein is expensive in Malawi. The country's livestock population is very small. In 1990, per capita cattle ownership averaged 0.12 compared to 0.54 in Kenya (Food and Agriculture Organization 1994). Second, while the poor consume other sources of animal protein (for example, insects and small ruminants, like rabbits and mice), their availability is seasonal. Finally, although Lake Malawi has been a rich traditional source of protein, fish are becoming increasingly scarce. The rivers and the lakes have been over-fished and fish farming has yet to be developed. Thus, both fish and meat are becoming increasingly expensive.

The limited availability and high price of animal-based protein has made certain agricultural crops to be the major source of protein for most of the population, especially the poor. Legumes (e.g. beans, cowpeas, pigeon peas and groundnuts) have the highest protein content and because of their superior amino acid balance are, compared to grains, a superior source of high-quality protein.

In Malawi, beans are the most important legume crop, in terms of both metric tons produced and hectares planted. In addition to their importance at the household level, beans also constitute a major part of the diet supplied by institutions - particularly schools, hospitals and prisons. Furthermore, bean leaves -- which are widely eaten -- are an important source of vitamins. It can therefore be said that, in many areas, beans are an important cash crop as well as a major source of cash income for households.

Recognizing the importance of beans, some agricultural scientists have given priority to improving this crop. Formal bean research began in 1969 when the National Bean Research Program (NBRP) was launched. In 1982, the USAID-funded Bean/Cowpea CRSP[1] joined with the National Bean Program in a collaborative effort to improve the productivity of smallholder bean production. Together, they began conducting research and training local scientists working for the project.

Initially, the NBRP focused on screening local varieties. In 1981, the program released to farmers six recommended varieties (*Sapelekedwa, Nasaka, Kamtsilo, Bwenzilaana, Kachitosi and Kamzama)* selected from the indigenous landraces. In 1993, it released three improved varieties, developed through cross breeding. These varieties were Bunda93, *Chimbamba* and *Kalima.* The current National Bean Improvement Program based at Chitedze Research Station released six varieties in 1995.

Despite these efforts, farmer yields remain about one-third of the level achieved at the experiment station (350 kg/ha versus 1,000 kg/ha) (Mkandawire and Mloza-

[1] CRSP refers to Collaborative Research Support Program. For the Malawi project, participating US Scientists are associated with the University of California at Davis and Michigan State University.

Banda 1993). While this implies the possibility of one day improving crop productivity, the reasons for the observed 'yield gap' are, so far, poorly understood. Together with the dietary importance of beans and their usefulness as cash crops to poor households, these low farmer yields point to a need to better understand the constraints faced by the bean subsector. Once identified, research must be directed at relaxing these constraints, to increase national production, increase farmer profits, and ultimately reduce the price of beans to consumers[2].

Agricultural scientists commonly equate increasing productivity with increasing yields. However, inefficiencies may lie elsewhere in the subsector. Since many bean consumers rely on the market to procure beans, there is also a need to better understand the subsector's vertical relationships (i.e., between production, distribution and consumption). While bean research in Malawi has given priority to increasing production, increases in marketing efficiency could reduce bean prices and thereby benefit consumers. Subsector analysis is a tool for providing the insights necessary to understand not only the factors constraining production, but also to identify inefficiencies in the coordination of these vertical functions.

To date, most of Malawi's bean research has focused on constraints to increasing bean yields. Making important contributions to scientific knowledge, there exists no overview of the subsector for integrating these findings and establishing overall research priorities. Thus, a subsector analysis is needed to bring together

---

[2] In terms of economic theory, higher productivity may be achieved by producing more with the same or fewer resources, or producing the same output with fewer resources.

information and identify future research directions and policies that are needed to increase the productivity of the subsector.

1.2 Research Questions

This subsector study will address production, marketing, consumption, and support services and policy questions. The questions are as follows.

Production Questions

- Where are beans produced? Why are they grown in large quantities in some areas but not others?
- In which locations are bean yields highest and why?
- Why are smallholder bean yields lower than those achieved at research stations?
- What are the socioeconomic characteristics of bean farmers and how do they limit the adoption of new bean technology?

Marketing Questions

- What determines bean distribution in the country (at the market level)?
- How and where are beans marketed?
- What proportion of national bean production is marketed?

- When do beans become available during the year and how do they fit into the household's food strategy?

Consumption Questions

- Who eats beans, how important are they in the diet, and in what form are they consumed?
- What factors determine household bean consumption patterns?
- What are the constraints to expanding bean consumption?
- What bean characteristics do consumers prefer?

Support Services and Policy Questions

- Do bean farmers have sufficient access to credit and extension services?
- What Government policies create incentives/disincentives to farmers, traders and consumers?
- What policy changes are needed to increase bean subsector productivity?

1.3 Research Objectives

Smallholder farmers, the major bean producers in Malawi, plant beans for both own consumption and for sale. Since beans are one of the major foodstuffs purchased by urban households and institutions, improved performance of the subsector depends not only on increasing yields, but on strengthening the coordination between

subsectoral functions (i.e., input acquisition, production, processing, distribution and consumption). The objectives of this study are therefore to:

1. Explore how the functions of the bean subsector are organized and how the subsector functions as a whole.
2. Understand the relationship between technologies, institutions and policies in determining the productivity of the subsector.
3. Identify barriers to improved performance in the subsector as well as identify the means for removing the barriers.
4. Pinpoint information gaps critical to improving the performance of the bean subsector.

1.4 Research Hypothesis

The main hypothesis of this study is that although improved technologies exist (i.e., improved varieties) to increase farmer yields, the existing institutions and economic incentives are insufficient to encourage farmers to adopt these technologies. Low productivity is therefore an indication of coordination problems within the system. Specific hypotheses related to production, marketing, consumption, and support services and policy are as follows.

Production Hypotheses

- Appropriate technologies exist that, if adopted, would increase farmer yields and profits.
- The recommended technologies (varieties and cultural practices) are not effectively transferred to farmers.
- High transaction costs reduce the rate of technological adoption.
- Poor coordination among the various parts of the subsector affects its performance.

Marketing Hypotheses

- The bean marketing system is poorly understood, leading to under-exploitation of specific marketing opportunities.
- A lack of facilitating structures within the bean marketing system (e.g., market information, transport etc.) leads to high transaction costs.

Consumption Hypotheses

- Bean consumption patterns are highly influenced by consumer preferences (e.g., taste, cooking characteristics and prices).
- Because of increasing meat and fish prices, bean consumption per household is likely to increase with time.

Support Services and Policy Hypotheses

- Increased access, among farmers, to credit and extension services will increase the bean subsector's productivity.
- Improvements in facilitating structures (like readily available market information and improved roads that result in less expensive transportation) will reduce transaction costs, thereby improving performance within the subsector.
- Market liberalization will increase the incentive for farmers and traders to carry out marketing functions (like transportation), in turn increasing subsectoral productivity.

1.5 Thesis Organization

This thesis is organized into eight chapters. Chapter 1 discusses the research problem and outlines the research questions and objectives. Chapter 2 presents an overview of Malawi. It describes the country's topography and climate, social and demographic characteristics, economic structure, importance of agriculture in the economy, and structure of the agricultural sector. Chapter 3 discusses the study's conceptual framework and methodology. Chapter 4 explores the role of beans in Malawi. Bean improvement research is covered in Chapter 5. Chapter 6 examines production inputs, credit and extension and information as they relate to the bean subsector. Chapter 7 focuses on government policies which influence the bean subsector. Last, Chapter 8 presents a summary, conclusions and proposed avenues for further research.

CHAPTER TWO

MALAWI: AN OVERVIEW

2.1 Topography and Climate

Malawi, a small country with an area of 119,140 square kilometers, occupies the southern part of the Great Rift Valley in East Africa. Lying between 9° and 17° south of the Equator, Malawi is the size of Pennsylvania, with 20% of its area covered by water. Malawi is a land-locked country, bordered by Mozambique in the southeast, south and southwest, Zambia in the northwest and Tanzania in the northeast. The country's topography ranges from the rift valley floor (50 to 200 meters above sea level) to 3,000 meter high mountains. Its climate, vegetation and associated economic activities are therefore widely variable (Malawi Government 1994).

Malawi consists of four agro-ecological zones (World Bank 1993):

- The Shire Valley, hot and semi-arid, lies at 30-40 m above sea level and has a mean annual rainfall of 500-700 mm.
- The Lakeshore plains, at 450-600 m, are warm-to-hot and have a mean annual rainfall of 750-1,000 mm.

- The medium-altitude plateau, covering 75% of the country, has an elevation of 800-1350 m, mild-to-warm temperatures, and a mean annual rainfall of 750-1,000 mm.
- The high altitude plateaus are 1,350 m and 3,000 m, with rolling hills as well as steep terrain, mild-to-cool temperatures, and a mean annual rainfall of 1,000-2,000 mm.

Beans are mainly grown in the medium to high altitude areas, where temperatures are cool.

2.2 Demographic, Social and Economic Characteristics

Malawi's population is estimated at 9 million, with an annual growth rate of 3.2%. About 85% of the population is rural-based. Over 80% of the total work force is employed in the smallholder agricultural subsector; 11% in the estate subsector (World Bank 1993).

In recent years, smallholder performance has been very weak. In the 1980-91 period, the annual GDP growth rate averaged 1.47% in the smallholder sector, compared to 9.37% in the estate sector. Thus, during both the 1980s and 1990s, the agricultural growth rate was substantially below the population growth rate of 3.2% (World Bank 1993). Such a slow growth in the agricultural subsector has contributed to rural stagnation and declining incomes for many households. As stated earlier, 55% of the population lives below the poverty line (World Bank 1994). According to a recent World Bank (1993) report, six interrelated factors associated with Malawi's

poverty level are: (1) limited employment opportunities; (2) low physical productivity of labor and land; (3) low levels of human capital; (4) limited access to land and economic rents[3]; (5) minimal income transfers; and (6) rapid population growth.

2.3 The Macro Economy

After an impressive economic growth in the 1960s and 1970s, Malawi's economy began a steady decline in the mid-1970s. The falling world prices for the country's exports (i.e., tobacco, tea, coffee and cotton), rising oil prices, and the civil war in Mozambique[4] simultaneously contributed to this decline. Between 1978 and 1981, Malawi's terms of trade fell by 28%. The situation was exacerbated by the 1980-81 drought, maturation of external debt, and rising interest rates. Consequently, Malawi experienced negative GDP growth rates during 1980 and 1981 (World Bank 1993).

In 1981, to restore macroeconomic stability and growth, the Malawi Government launched a structural adjustment program with assistance from the World Bank and the International Monetary Fund (IMF). The program's aim was to establish policies which would enhance economic efficiency, including market liberalization, import liberalization, currency devaluation, changing from a fixed to a floating exchange rate system, downsizing the public subsector, liberalizing pricing policies, and removing agricultural inputs and output subsidies (Sahn et al. 1990). By

---

[3] Economic rent is that portion of payment to the supplier of an input that is in excess of the minimum amount necessary to retain the input in its present use (Browning et al., 1992).

[4] The civil war disrupted access to cheaper transport routes to the coast through Mozambique.

adopting these policies, it was envisaged that resource allocation would improve, thereby increasing economic efficiency - a prerequisite to economic growth.

Between 1982 and 1985, the economy showed signs of recovery. The GDP grew at a rate of 4.1%, the trade balance became positive, and both the current account and budget deficits declined (World Bank 1994).

However, in 1986 Malawi was faced with a large influx of refugees fleeing the civil war in Mozambique. Reaching a record high of 1 million, Malawi's refugee population became equal to about 10% of its regular population (Sahn et al., 1990). Also, since the war led to closure of Malawi's traditional transport routes to the sea, transportation costs for Malawi's exports and imports increased, leading to terms of trade deterioration. As an exporter, higher transportation costs made the country's agricultural commodities less competitive on the world market. As an importer, Malawi had to pay higher transport costs than before. These events necessitated further macroeconomic policy changes, primarily successive currency devaluation.

In the 1990s, additional structural adjustment phases are being implemented, including removal of the fertilizer subsidy, deregulation of foreign currencies, and market liberalization. Despite these measures, Malawi's economy has yet to substantially improve. While per capita GDP averaged US$ 240 (World Bank 1993) in 1991, it has declined in recent years for two reasons. First, the droughts of 1992 and 1994 reduced agricultural output. Maize production fell from 1.6 million mt in 1990-91 to 0.7 million mt in 1991-92 (a 58% drop), leading to a decline in the GDP (Table 2.1). Second, in 1992-93, foreign donors withheld non-humanitarian aid to Malawi,

pending political changes. Although foreign aid has recently been restored, the negative effects of the 1994 drought on the GDP growth rate will continue to be felt for some time to come.

Table 2.1: Smallholder Production of Main Food Crops, Malawi, 1983-84 to 1992-93.

Crops	Annual Production ('000 mt), Hectarage ('000 ha in parenthesis)										
	1984	1985	1986	1987	1988	1989	1990	1991	1992 [a]	1993	10 Year Mean
Maize	1,398 (1,174)	1,355 (1,145)	1,295 (1,193)	1,201 (1,182)	1,435 (1,215)	1,510 (1,270)	1,343 (1,344)	1,589 (1,392)	657 (1,369)	2,034 (1,327)	1,382 (1,261)
Cassava	259 (82)	209 (80)	218 (71)	169 (65)	135 (62)	155 (73)	145 (62)	168 (72)	129 (64)	216 (75)	180 (71)
Sweet Potatoes	60 (21)	81 (23)	80 (22)	121 (29)	102 (29)	177 (44)	95 (30)	177 (48)	43 (20)	211 (34)	115 (30)
Beans	[b] (b)	[b] (b)	22 (38)	29 (61)	28 (62)	28 (48)	71 (97)	69 (116)	56 (127)	70 (132)	47 [c] (85[c])
Rice	35 (22)	34 (21)	37 (23)	28 (19)	32 (23)	46 (26)	43 (29)	63 (33)	24 (18)	65 (39)	41 (25)
Groundnuts	55 (145)	62 (133)	88 (176)	88 (210)	77 (176)	35 (140)	19 (48)	31 (70)	12 (64)	32 (61)	50 (122)

Source: Malawi Government (1993), *Malawi Agricultural Statistics. Annual Bulletin. Pages 5 to 8.*

[a] Production was low this year because of the 1991-92 drought

[b] Data not available

[c] 8-year mean

In 1992 and 1993, although the value of imports exceeded that of exports, the trade deficit improved from 786 million Malawi Kwacha[5] in 1992 to 539 million Malawi Kwacha 1993 (World Bank 1993). This decline in the trade deficit was due, not to an increase in exports but rather a foreign exchange scarcity in 1993 which reduced Malawi's capacity to import.

Despite devaluing its currency several times in the 1980s, trade statistics indicate that the terms of trade have not improved. For example, in 1993, the unit value of imports rose by 15.3% while that of exports rose by 2.4%[6]. Using 1990 as the base year, the income terms of trade for 1993 was 78.8% (World Bank 1994). Thus, all things being equal, Malawi would have had to export substantially more goods in 1993 to finance the same level of imports as in 1990.

Furthermore, Malawi's successive devaluations have contributed to high inflation. Again using 1990 as the base year, the consumer price index rose to 520% in 1992, largely due to devaluation in 1992 (World Bank 1994). This followed the general increase in wages after a country-wide general industrial strike. In 1994 the exchange rate was changed from a fixed to a floating system. As a result, the currency value fell by 400% against the US dollar (i.e., before devaluation, US$ 1 = MK 3.5; after devaluation, US$ 1 = MK 15). Then, in 1995, the Malawi Government both

---

[5] Kwacha, Malawian currency. ($1= 15.99).

[6] Tobacco, the country's main export commodity, accounted for 69.1% of export earnings in 1993. Other main exports were tea (11.5%), sugar (5.1%), coffee (2.6%), and other exports (10.6%) (Malawi Government, 1994). Because of the structure of exports, the economy is vulnerable mainly to shocks in the tobacco market. Because the main export is tobacco in raw form with little value added while import are mainly products of high value added.

removed the subsidy on fertilizer (that averaged 15% of the selling price) and eliminated the consumer subsidy for maize. Although not yet documented, the removal of the maize subsidy will have a significant, negative, short-run impact on both urban consumers and food deficit households. Similarly, removal of the fertilizer subsidy will likely reduce input use, resulting in lower maize yields.

2.4 Contribution of Agriculture to the Economy

In 1993, agriculture accounted for 32% of Malawi's GDP and 87% of its export earnings (Malawi Government 1994). Other major contributors to the 1993 GDP were government services (15%), manufacturing (12%), distribution (11%) and others (10%). Because of its importance, the general performance of the economy strongly depends on the performance of the agricultural sector. For example, whereas the 1992 drought caused the GDP growth rate to decline by 7.9%, the 1993's good rains caused the GDP to grow by 10.3% (Malawi Government 1994).

2.5 Agriculture: Structure and Scope

Agriculture in Malawi is characterized by the estate subsector and the smallholder subsector. Both subsectors are important but make different contributions to the economy. While smallholder agriculture accounted for 73% of the agricultural GDP in 1993, the estate subsector accounted for 90% of agricultural exports (Malawi Government 1994).

2.5.1 The Estate Subsector

The estate subsector, composed of 14,700 estates occupying 850,000 hectares, mainly grows export crops such as tobacco, tea, sugar, and coffee (Table 2.2)[7]. The estates bring in the most foreign exchange and are the primary producers of cash crops. Unlike smallholders, estates sell their crops directly to international buyers at the local auction markets.

Estates acquire land through leasehold and freehold land tenure arrangements. Most are operated by local private companies like the Press Farming and General Farming Companies, each of which is a subsidiary of Press Corporation Limited[8]. However, multinational companies are also involved in estate farming, including Dwangwa Sugar Corporation[9], the Sugar Corporation of Malawi[9], British Central African Limited (tea and coffee), and Lever Brothers Malawi Limited (tea). In contrast, local estate owners mainly grow burley tobacco.

Until recently, smallholders were not allowed to grow certain estate crops, like burley tobacco. Mkandawire et al. (1990) reported that since lifting this restriction, some smallholders have graduated to estate status. However, most smallholders do not have the resources needed to successfully grow these crops.

---

[7] Only one-third of this land is under cultivation (Malawi Government/United Nations, 1992).

[8] These are mainly tobacco growers. Press Farming grows burley tobacco while General Farming grows flue-cured tobacco. Press Farming sublets its land to tenants while General Farming hires laborers to carry out farming operations.

[9] These companies, owned by LONRHO Company, grow sugarcane and manufacture sugar.

Table 2.2: Estate Crop Production, Malawi, 1982-83 through 1991-92

Crop	Production and Hectarage ('000 Mt and '000 Ha in parenthesis)										
	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	10-Year Average
Tobacco-flue	21659	24912	22291	21034	24464	20743	20000	21819	25747	26,000[a]	22866
Tobacco-burley	41537	29979	30372	30190	36789	45544	61212	64019	75013	118,000[a]	53266
Sugar	175 (14.4)	150 (14.0)	144 (13.8)	164 (14.0)	166 (14.6)	174[a] (14.6)[a]	162[a] (14.6)[a]	189[a] (15.0)[a]	191[a] (15.0)[a]	244[c]	176 14[d]
Tea[b]	32 (19)	37.5 (19)	39.9 (19)	39 (19)	31.9 (19)	40.1 (18)	39.5 (18)	38.9 (19)	40.5 (19)	[c] [c]	38[d] 19[d]

Source: Malawi Government (1993), *Malawi Agricultural Statistics. 1993 Annual Bulletin'.* Pages 31, 33, 36.

[*] Estimates, [b] Hectarage refer to land with mature crops only, [c] Data not available
[d] 9-Year Average

2.5.2 The Smallholder Subsector

The smallholder subsector is characterized by small farmers cultivating food crops under customary land tenure (Sahn et al. 1990). While mainly producing for subsistence purposes, many also market part of their produce to meet cash needs. Smallholders primarily grow maize, tobacco[10], cassava, and sweet potatoes (Table 2.1). Whereas there are smallholder schemes for cash crops like flue-cured tobacco, sugar, tea and coffee[11], participation is highly location- specific. One major constraint facing smallholders is small landholdings, which, according to a National Sample Survey of Agriculture, averaged 1.17 hectares per smallholder household in 1980-81 (Malawi Government 1984).

2.5.2.1 Farm Size Classes

The Malawi Government (1994) classifies smallholder farmers into three categories: the 35% with less than 0.7 hectares, who cannot satisfy their subsistence food requirements with existing technologies; the 40% with landholdings between 0.7 and 1.5 hectares who, using modern technology, can normally satisfy their subsistence requirements as well as the potential for modest crop sales in good rainfall years; and the remaining 25% who are relatively land-rich, with landholdings of 1.5 hectares or greater. This last group can plant their fields to both food and cash crops.

---

[10] This includes three types of tobacco previously grown by smallholders; dark-fired tobacco, sun-air-cured tobacco and Turkish tobacco. Now smallholder farmers are allowed to grow burley tobacco.

[11] Parastatal organizations organize these farmers in order to produce and market these export crops. These are Kasungu Flue Cured Tobacco, Dwangwa Smallholder Sugar Authority, Smallholder Tea Authority and Smallholder Coffee Authority.

Table 2.3: Smallholder Production of Cash Crops, Malawi, 1983-84 through 1991-92

Crops	Annual Production ('000 Mts) and Area ('000 ha in parenthesis)									
	1984	1985	1986	1987	1988	1989	1990	1991	1992[b]	10 Year Average
Cotton[a]	56	59	36	32	47	33	[d]	[d]	[d]	26.30
	(51)	(64)	(52)	(35)	(48)	(50)	[d]	[d]	[d]	
Fire-cured	16,165	18,680	11,362	10,056	7,987	4,715	14,001	15,735	12,523[c]	11,122.40
	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
Sun-Air-cured	1,939	1,870	954	981	560	372	1,396	2,023	2,084[c]	1,217.90
	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
Turkish	334	129	121	97	161	280	168	515	515[c]	232.00
	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	[d]	
Sugar	9	9	9	8	8	9	9	8	10	7.90
	(0.597)	(0.617)	(0.612)	(0.607)	(0.608)	(0.597)	(0.608)	(0.595)	(0.591)	
Tea	8	10	13	11	10	13	14	14[c]	14[c]	10.70
	(2.3)	(2.3)	(2.4)	(2.4)	(2.4)	(2.4)	(2.4)	(2.3)[c]	(2.3)[c]	

Source: Malawi Government (1993), *Malawi Agricultural Statistics Annual Bulletin*. Pages 29 to 30, 33 and 36.

[a] Ginned bales, [b] Production was low this year because of the drought in the 1991/92 season, [c] Estimates, [d] Data not available

2.5.2.2 Crops Grown

Maize, Malawi's staple food for more than 80% of the population, accounts for about 70% of the cultivated customary lands under smallholder agriculture. Approximately 90% of the country's maize is produced by smallholders and 10% by the estate subsector (World Bank 1993). While hybrid maize research has been ongoing in Malawi for many years, 86% of the maize hectarage is still planted to local varieties, 2% to composite varieties and only 12% to improved hybrids (World Bank 1993). To date, low adoption rates for improved hybrids are attributed to the poor storage and processing characteristics of the earlier dent hybrids (Conroy, 1993). Flint varieties have endorsperms which contain a high proportion of 'hard starch' while dent varieties have mainly soft starch. These characteristics give flint varieties better storage and pounding properties than dent varieties. However, the new semi-flint hybrids (MH 17 and MH 18), released in 1992, are expected to better match farmer preferences.

Cassava and sweet potatoes are the second and third most important food crops (by area) produced in Malawi. Yet, in some locations, particular crops are grown especially intensely. For example, farmers bordering Lake Malawi grow cassava and rice as their main food crops, especially in northern Malawi. Similarly, groundnuts are grown in the mid-to-upper altitude areas, although in recent years groundnut production has declined. In 1989, pulses (i.e. beans, pigeon peas, and cowpeas) displaced groundnuts as the most important legume produced. In 1990, beans replaced groundnuts and are now the single most widely-grown legume (Figure 2.1).

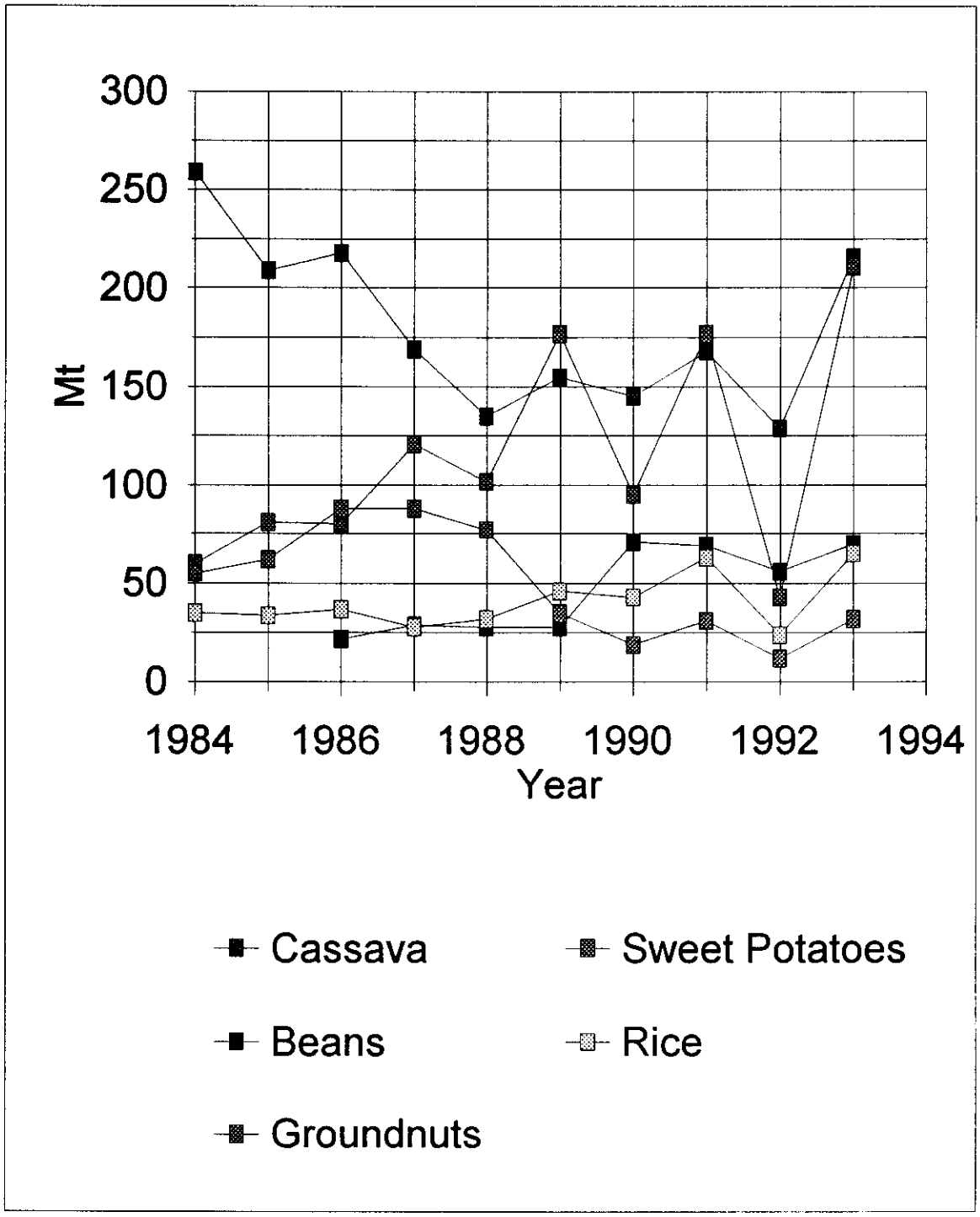

Figure 2.1: Average Smallholder Food Crop Production, Malawi 1988-1992.

Entirely rain-fed, it should be kept in mind that food crops are extremely vulnerable to the weather. For example, as stated previously, food crop production fell significantly in response to the 1991-92 drought. Increasingly, smallholders are also expanding into cash crop production (Table 2.3). Not allowed to grow burley and flue-cured tobacco before 1992, this regulation has since been relaxed. Smallholders are especially attracted to burley tobacco production as it is less capital intensive and therefore relatively easier to grow than flue-cured tobacco.

2.5.2.3 Smallholder Input Use and Credit

The overwhelming majority of smallholders use little or no purchased inputs (i.e., fertilizer, insecticide, herbicide, or improved seed). In 1989-90, smallholders applied an average of 23 kg of plant nutrients per hectare of arable land, compared to 48 kg/ha in Kenya and 60 kg/ha in Zimbabwe (World Bank 1992). Furthermore, within the smallholder sector, input use is highly skewed. Typically, larger farms on customary land use far more fertilizer than the smallholders who cultivate the smallest holdings (Conroy 1993).

Finally, most smallholders either do not have access to credit or choose not to use it. About 25%-30% of smallholder farmers participated in the Government formal credit program, wherein participants receive in-kind credit consisting of fertilizer, seeds and chemicals - dependent on the hectarage a farmer will plant to a particular crop (Conroy, 1993). The Smallholder Agricultural Credit Administration (SACA)

collapsed in 1992 because the farmers did not repay their loan. It has since been replaced by the Malawi Rural Finance Company.

2.6 Summary

Malawi's economy is based primarily on agriculture, which contributes 32% of the country's GDP and 87% of export earnings. Comprised of the smallholder and estate subsectors, the estate subsector is the main foreign exchange earner while the smallholder subsector provides the bulk of the country's food needs.

The smallholder sector is characterized by smallholder farmers cultivating small landholdings, mainly growing crops for their own consumption and selling the surplus. In the past, only a small proportion of smallholders uses purchased inputs and, while there was a government credit program, no more than 30% of smallholders benefit from it. The main crops grown by smallholders are maize, cassava, potatoes and legumes. Among the legumes, beans are the most prominently grown among smallholder farmers.

The remainder of this study focuses on beans in an attempt to identify ways to improve the performance of this subsector, thereby increasing the availability of protein to the population, especially the poor.

CHAPTER THREE

LITERATURE REVIEW, CONCEPTUAL FRAMEWORK AND METHODOLOGY

3.1 Literature Review

Subsector studies first became popular in the late 1960s. Shaffer, the first proponent of this research approach, defined a food and fiber subsector as "the vertical set of activities in the production and distribution of a closely related set of commodities" (Shaffer, 1968). In recent years, the concept has been alternatively defined by other researchers. Bernsten et al. (1992) defined a subsector as "a vertical slice along commodity lines, involving all stages of production from input supply to final consumption". Similarly, Marion (1986) defined a subsector as an 'interdependent array of organizations, resources, laws, and institutions involved in the producing, processing, and distributing an agricultural commodity'. These definitions all highlight the need to analyze the coordination of a vertical set of activities - like input distribution, production, assembly, storage, transport, processing and product distribution.

Also, a subsectoral work also aims to understand sequences of activities, as well as the feedback and externalities generated by these activities. Likewise, it incorporates examining the policies and institutions which affect a subsector. Subsector studies are

geared towards understanding the interdependencies and effects which are neither immediate nor obvious (Marion 1986). The division of the total agricultural system into subsectors provides more manageable units of observation while permitting consideration of the vertical relationships that are essential to an industry's coordination and performance.

Because of its holistic perspective, subsectoral findings are especially useful in guiding both public and private decisions regarding investments, exchange arrangements and regulations. Also, the findings can help identify unexploited or under-exploited economic opportunities, anticipate problems and facilitate performance evaluation.

As countries develop, economic structural changes occur which have major implications for the food and fiber sectors. Conventional wisdom quickly become obsolete, given the speed and magnitude of these changes. For example, Bernsten et al. (1992) note the following:

1. Development involves specialization and technical change, both of which lead to a greater reliance by farmers on the economy's off-farm elements.
2. Over time, population growth, urbanization, and income diversification cause a greater proportion of the population to rely on the market for food.
3. Structural adjustment induces major changes in both the marketing and processing systems.
4. As economies become increasingly integrated, changes at one level increasingly affect other levels of the system.

In addition to providing a benchmark for understanding of the current status of a subsector, data analysis of this kind can provide insights about how to best address the food policy dilemma (Timmer 1990)[12]. Timmer identifies four major components in the analytical process: (1) determining a feasible set of policies, (2) extending the degrees of freedom for policy choice, (3) determining what investments are needed to break the binding constraints on policy choice, and (4) devising policies to deal with short run consequences of efficient, long-run, food sector development (Timmer 1990).

Typically, subsector studies can help identify specific policy options for relaxing any identified constraints. For example, after carrying out a rapid appraisal of cowpea marketing in Niger, Abt Associates Inc. (1988) recommended, among other things, that removal of the export tax would increase the competitiveness of Niger's exports, thereby encouraging unofficial traders to conduct larger and more efficient transactions. Thus, by studying various stages of the marketing process, constraints to increasing efficiency were identified.

This study of the bean subsector in Malawi will contribute to our understanding of how various activities within the system are currently structured and coordinated. Such an understanding is needed to help researchers identify promising opportunities for increasing productivity. Also, it will help to diagnose barriers to expansion - including factors for increasing producer incentives while avoiding increased bean processing systems.

4. As economies become increasingly integrated, changes at one level increasingly

[12] Timmer (1990) defined 'food policy dilemma' as the situation faced by a country when it attempts to keep food prices down (to ensure the basic survival of the poor) without dampening the incentives necessary for the maintenance of long-run food production growth.

3.2 Methodology and Data Sources

This study relies on both primary and secondary data. First, a historical information regarding crop production, crop volumes, crop hectarage, producer prices, and consumer prices were obtained from the Agricultural Planning Division of the Ministry of Agriculture. The Geographical Information System program, Atlas GIS, was used to display how these production characteristics (i.e., bean production and bean hectarage) vary by administrative area across the country[13].

Consumer price levels obtained at four urban markets are compared to assess the seasonality of bean prices. Annual average consumer prices (for 5 years) are computed for the same markets to determine average annual price ranges among different markets. In all, data from three are analyzed using Quattro Program.

Second, publications from research work conducted by the Bean/Cowpea CRSP over the past 15 years are used to integrate findings from various disciplines, including plant breeding, agronomy, plant pathology and the social sciences. Third, there is an analysis of primary data from socioeconomic surveys Bean/Cowpea CRSP conducted in 1990 and 1991. This study was conducted by the author with the supervision of social scientists from the Bean/Cowpea CRSP-Malawi Project. These data provide further insights into farm-level and consumption-level issues. The areas are Matapwata EPA in south Malawi, Kalira EPA in central Malawi and South and North Phoka EPA in north Malawi.

---

[13] Rural Development Project is an ecologically similar area in which agricultural development projects are planned and carried out. In all, Malawi has 28 Rural Development Projects. These data will be presented as 5-year averages per Rural Development Project.

CHAPTER FOUR

BEANS IN MALAWI

4.1 Introduction

4.1.1 Consumer Preferences

In 1990 and 1991, the National Bean Program conducted a study of bean consumption patterns and varietal preferences among farmers[14]. The findings of this study provide insights regarding country-wide preferences.

Among those interviewed (Table 4.1), the most favored bean variety was *Chimbamba* (preferred by 41% of all respondents), followed by *Nanyati* (15%) and *Nyauzembe* (12%). In terms of geographical distribution, *Chimbamba* was found in large quantities in all areas (i.e., 64% in the south, 24% in the central region and 38% in the north). It was the favorite variety in the south and north, and the second favorite in central Malawi. In the central region, the most favorite bean variety was *Nanyati* (26%) and third *Kayera*. In the north, the proportion of respondents indicating

---

[14] The survey was conducted in three extension planning areas (EPAs), in each of Malawi's three regions: Matapwata EPA - in the Blantyre Agricultural Development Division (south), Kalira EPA in the Kasungu Agricultural Development Division (central region), and the North and South Phoka EPAs in the Mzuzu Agricultural Development Division (north).

The main focus of the survey was to study bean use, production practices and bean production constraints. Although the target sample size was 300 households per site, 271 valid questionnaires were obtained for Matapwata, 282 for Kalira, and 291 for North and South Phoka.

to like *Nyauzembe* and *Chimbamba* was the same, 38%. Data in Table 4.2 show the characteristics of Malawi's main bean varieties and their distribution across the country.

Table 4.1: Most Favored Bean Variety - By Region, Malawi, 1990 and 1991

Name	South		Center		North		Overall
	No.	%	No.	%	No.	%	%
Chimbamba	157	63.6	66	23.9	87	38.3	41
Nanyati	23	9.3	73	26.4	13	13	15
Nyauzembe	0	0	0	0	87	38.3	12
Kayera	10	4	64	23.2	12	5.3	11
Kaulesi	54	21.9	1	0.4	0	0	7
Salima	0	0	36	13.0	0	0	5
Others	3	1.2	36	12.9	28	12.4	9
Total	247	100	276	100	227	100	100

Source: Ferguson et al. (1991), *Technical Report: Bean Production and Use Practices: results of the 1990-91 Socioeconomic Research in the Three Regions of Malawi*. Page 101.

Table 4.2: Most Favored Bean Characteristics, Malawi, 1990-91

Bean Variety	Color	Size	Special Attributes
Chimbamba	Red monocolored	Large kidney	Most common bean variety in the country
Nanyati	Khaki, variegated red/purple	Medium/large kidney	None
Nyauzembe	Dark green monocolored	Medium round	Mostly found in northern Malawi
Kayera	White monocolored kidney and round	large and small	None
Kaulesi	Khaki with purple speckles	Small/medium	Fast cooking and mostly found in the south
Salima	Light red monocolored	Medium	None

Source: Ferguson et al. (1991), *Technical Report: Bean Production and use Practices: Results of the 1990-91 Socioeconomic Research in the Three Regions of Malawi.* Page 70.

For some varieties, there was a strong regional preference. For instance, while *Nyauzembe* was highly favored in the north (38%), it was not favored in the other regions. In the south, *Kaulesi* was the second most favored variety (22%), but not favored in the other regions. In the central region, *Nanyati* was preferred by 26%, *Kayera* - 23% and *Salima* - 13%.

A variety of reasons were given for varietal preferences. Market influence was higher in the south than in the other areas (16% compared to 5% in the central region and 3.1% in the north) (Table 4.3a).

4.1.2 Home Preparation

Although regional variation exists in Malawi, beans are most commonly consumed as boiled, dry beans. Sixty-eight percent of the survey's southern respondents indicated that they mainly consume dry beans, compared to 61% in the central region and 58% in the north. Yet consumption of bean leaves was much higher in the central and northern region, 21% and 19% respectively (compared to less than 1% in the south where respondents indicated that using bean leaves reduces bean yields) (Ferguson et al. 1991).

To prepare dry beans for consumption, they are most commonly soaked and then boiled in water. Once softened, they are mixed with tomatoes, onions and sometimes cooking oil to make stew. The resulting stew is eaten with *nsima*, a maize porridge.

Dry beans are prepared in a variety of ways. In some cases, beans are first soaked or semi-boiled, after which the seed coat is removed and the beans further boiled until soft. The beans are then mashed into a porridge-like stew called *chipele*. Sometimes beans are cooked with bananas to make a dish called *mbaranga,* an especially common dish in the north. In some cases *ngata* is made by boiling beans and maize.

In addition to dry bean preparations, dishes are also prepared from young "green" beans. Sometimes, they are boiled and eaten alone (*makata)* or the green immature pods (at snap stage) are boiled to produce a relish called *zitheba.*

Finally, green leaves are boiled to produce a dish called *khwanya.* Is some cases, the leaves are dried after boiling, to preserve them for consumption during the off-season. This is called *mfutso,* a common dish among low-income households. For the bean leaf dishes, groundnut flour is added instead of cooking oil to improve the taste.

4.1.3 Bean Packaging and Processing

Beans are usually sold "loose", at local markets by retail traders who store their bulk beans in hessian bags, plastic bags or bamboo baskets. Dry beans are mostly sold by variety, but are sometimes mixed. Upon making a sale, the trader wraps the beans in paper - be they in dry, green, or snap form. Excluding the occasional application of actellic, as protection against pests and removal of dirt, beans sold in local markets are not processed.

Beans are also sold in supermarkets - to middle to upper-income consumers - as dried, snap and green beans. Green beans and snap beans are typically packed in plastic bags. In some cases, beans are initially unpacked, with consumers choosing the quantity of beans they want by placing their purchase in plastic bags. On the other hand, dried beans are marketed in two ways. They are either displayed in bulk containers and transferred to plastic bags upon sale, just as with snap and green beans, or they are sold in packed form, each pack weighing 500 g or 1 kg. In this case, a food processing company, Tambala Food Production does the packaging, giving the package a brand name. Each of the country's two main supermarket chains has its own brand name. The People's Trading Company markets "Tambala Beans"; while Kandodo markets sell "Kabula Beans"[15].

Currently, apart from cleaning, local bean processing is limited to the production of a flour called *likuni phala*, a weaning food developed by the Likuni Catholic Missionary Center. Traditionally, the Government health workers were encouraging mothers to use beans as a protein base when preparing their own weaning foods[16].

---

[15] All three companies, Tambala Food Products, Kandodo Supermarket, and the People's Trading Center belong to Press Holdings Corporation.

[16] In recent years, soybeans have been planted as a bean substitute in weaning foods. Farmers, however, tend to sell their soybean crops - instead of consuming them - because soybeans require further processing before consumption.

4.2 Demand Analysis

4.2.1 Domestic Consumption

Bean consumption in Malawi is assumed equal to official bean production estimates since there are no recorded imports or exports. However, during a visit to the Lizulu market[17] in January 1995, bean sellers at the market reported that most of the beans sold at the market were from Mozambique. Not only do Mozambican producers near the border take advantage Malawi's high market prices, but the sellers also reported buyers coming from as far away as Zambia and Mozambique. This suggests the existence of a considerable, although unrecorded, intra-regional trade in beans. Consumption figures may therefore either underestimate or overestimate actual per capita consumption.

Notwithstanding the quality of these data, per capita bean consumption has risen over the past eight years, from 2.9 kg in 1985-86 to 4.7 kg in 1992-93 (Table 4.3).

[17] This market, on the border between Malawi and Mozambique, is one of the most important bean markets in the country. Bean sellers in the two largest cities in Malawi, Blantyre and Lilongwe Cities, indicated to have bought their beans from this market.

Table 4.3: Total and Per Capita Bean Consumption, 1985-86 to 1992-93, Malawi

Agricultural Year	Total ('000mt)	Consumption per Capita (kg)
1985/86	22.5	2.9
1986/87	28.7	3.6
1987/88	28.1	3.4
1988/89	27.5	3.3
1989/90	27.6	3.2
1990/91	38.7	4.3
1991/92	30.3	3.3
1992/93	45.3	4.7

Source: Malawi Government (1993), *Malawi Agricultural Statistics. Annual Bulletin.* (Computed from total annual production and population estimates).

4.2.2 Reasons for Growing Beans[18]

Smallholder farmers use beans in different ways - for home consumption, for selling and as gifts (Table 4.4). Although farmers grow beans for home consumption and sale, in Matapwata (Malawi's southern region), 50% of the respondents reported selling most of their beans. Similarly, 45% of the respondents made the same claim in Kalira (central region). In contrast, in South and North Phoka (in the northern region), only 16% reported selling most of their crop.

[18] Most data presented in this section are from the 1990-91 Bean/Cowpea CRSP socioeconomic survey on bean use and production constraints in Malawi.

Beans are an important cash crop in the Matapwata area because it is located near Blantyre, the largest city in Malawi. Therefore, farmers have good access to a ready market for their beans. At the same time, farmers in this area have small landholding sizes therefore do not have the choice to plant other cash crops like tobacco as is the case with farmers in other areas. While Kalira is farther away from the urban center, respondents indicated the ease with which they can sell beans to private traders and ADMARC[19]. While few farmers in the distant North and South Phoka sell beans (6%), a high proportion (40%) either gave beans to friends or used beans as in-kind wages.

[19] Agricultural Development and Marketing Corporation, a parastatal corporation.

Table 4.4: Respondents' Use of Beans by Region, Malawi, 1990-91

Use of Beans by Area	South		Center		North	
	No.	%	No.	%	No.	%
Sell most beans	134	50.0	130	45.1	42	16.4
Eat most beans	104	38.8	96	33.3	91	35.5
Sell/eat same quantity	24	9.0	37	12.8	22	8.6
Other	6	0.2	25	8.7	101	39.5
Total	268	100	288	100	256	100

Source: Ferguson et al. (1991), *Technical Report: Bean Production and use Practices: Results of the 1990-91 Socioeconomic Research in the Three Regions of Malawi.* Page 84.

4.2.3 Farmers' Varietal Preferences

A typical Malawian farmer plants a mixture of several varieties at any one time. Nevertheless, the respondents reported specific reasons for preferring certain varieties (Table 4.5)[20]. In all three areas, farmers reported "yield" as the most important varietal selection criterion (32%). This was followed by "good taste" (28%), "fast cooking" (13%), "highly marketable" (8%), "early maturity" (8%), and "suitability to the area" (2%) as reasons for preferring one variety over another.

Among the consumption factors, good taste was considered most important in all areas (32% in the south, 22% in the central region, and 31% in the north). The second most important reason was a bean's ability to cook fast, a trait normally attributed to *Kaulesi*, a variety commonly found in Matapwata in the south. In the south, about 16% of the respondents indicated a preference for certain varieties because they are highly marketable. This compared with only about 5% in the central region and 3% in the north. This implies a higher level of commercial activity among southern than other bean farmers. This could be so because of the influence of Blantyre City in Matapwata EPA.

---

[20] See Table 4.2 for the characteristics of these varieties.

4.2.4 Urban Varietal Preferences

Informal interviews with retailers (conducted in 1994/95 at the Lilongwe and Blantyre city markets) showed that, at the retail level, consumers prefer fast-cooking varieties that also have a good taste. The most common varieties at these markets were *Chimbamba*, *Nanyati* and *Kayera*. While these varieties are also found in the north, *Nyauzembe* is, by far, the dominant variety in the region. However, *Chimbamba* is the most common variety throughout the three research areas.

Table 4.5: Reasons Farmers Prefer Certain Bean Varieties, Malawi, 1990-91

Reasons for Preferring	South		Center		North		Overall
Varieties	No.	%	No.	%	No.	%	%
High-yielding	41	19.2	70	33.2	98	42.8	32
Good taste	67	31.5	47	22.3	72	31.4	28
Cooks fast	37	14.7	31	14.7	18	7.9	13
Highly marketable	35	16.4	11	5.2	7	3.1	8
Early maturity	16	7.5	23	10.9	12	5.2	8
Suited for the areas	8	3.8	3	1.4	1	0.4	2
Others[21]	9	4.2	26	1	21	9	9
Total	213	100	211	100	229	100	100

Source: Ferguson et al. (1991), *Technical Report: Bean Production and use Practices: Results of the 1990-91 Socioeconomic Research in the Three Regions of Malawi*. Page 102.

[21] Other reasons included: beans turn creamy when cooked, are easy to store, are drought-resistant, and produce snaps for a long time.

4.3 Production Analysis

4.3.1 Bean Hectarage, Yields and Production

Malawi's increase in bean production is due to both an increase in hectarage and growth in per area yield (Table 4.6). The area planted to beans has increased, on average, by 10% per year from 1985-86 to 1992-93. Meanwhile, bean yield has also been growing - averaging 4.2% per year over a period of 7 years from 1985/86 to 1992/93. This yield increase has been highly irregular from year to year, decreasing as much as 8% one year, 1987/88 and increasing by 51% another year, 1992/93 .

Despite the steady increase in area planted to beans, overall bean production seems most affected by yield changes. For example, in 1991-92, despite a 9% increase in area planted to beans, and 8% decrease in yields resulted in a 22% reduction in production. Thus increased hectarage alone will not increase bean production in the absence of high-yielding technologies.

Table 4.6: Bean Area, Yield and Production, 1985/86 to 1992/93, Malawi, 1993

Year	Area (ha)	Annual Area growth %[a]	Yield (kg/ha)	Annual Yield Growth %[a]	Production (mt)	Annual Production Growth %[a]
1985/86	71,329	-	316	-	22,545	-
1986/87	86,626	21.4	332	5.1	28,725	27.4
1987/88	91,345	5.4	307	-7.5	28,071	-2.3
1988/89	93,506	2.4	294	-4.2	27,522	-1.9
1989/90	96,499	3.2	286	-2.7	27,638	0
1990/91	116,268	20.5	333	16.4	38,755	40.2
1991/92	126,969	9.2	239	-8.2	30,341	-21.7
1992/93	132,879	4.7	360	50.6	45,257	49.2
Average	101,927[b]	9.5[c]	308[b]	4.2[c]	31,106[b]	13.0[c]

Source: Malawi Government, 1993 *Malawi Agricultural Statistics, 1993 Annual Bulletin.* Pages 5-10.

[a] Growth over the previous year
[b] Eight-year average
[c] Seven year average growth rate

4.3.2 Bean Environments

In Malawi, beans are mainly grown in mid-to-high altitude areas where temperatures are relatively cool (750 m to 1,500 m above sea level) (Kantiki 1989). Although the National Bean Program identified ten Rural Developments Projects (RDPs) of the 28 Rural Development Projects as the main bean-growing areas in the country, this study identified an additional bean-producing area - the Thiwi/Lifidzi RDP[22].

[22] Malawi is divided into eight Agricultural Development Division

Figure 4.1 shows average bean production per RDP, as a percent of the national average[23]. Figure 4.2 shows average bean hectarage in RDPs as a percent of average national bean hectarage. The RDPs with the highest areas planted to beans (between 10 to 15% of the national average) are Chitipa, Kasungu, Ntchisi, Dedza Hills, Ntcheu, Zomba, Salima and Blantyre Shire/Highlands. All are in mid-to-high altitude areas. In lower altitude Salima, where production is also high, beans are grown during the *dimbas*[24] (the dry season).

[23] Eight years of data were used in these calculations. They are the only data available.

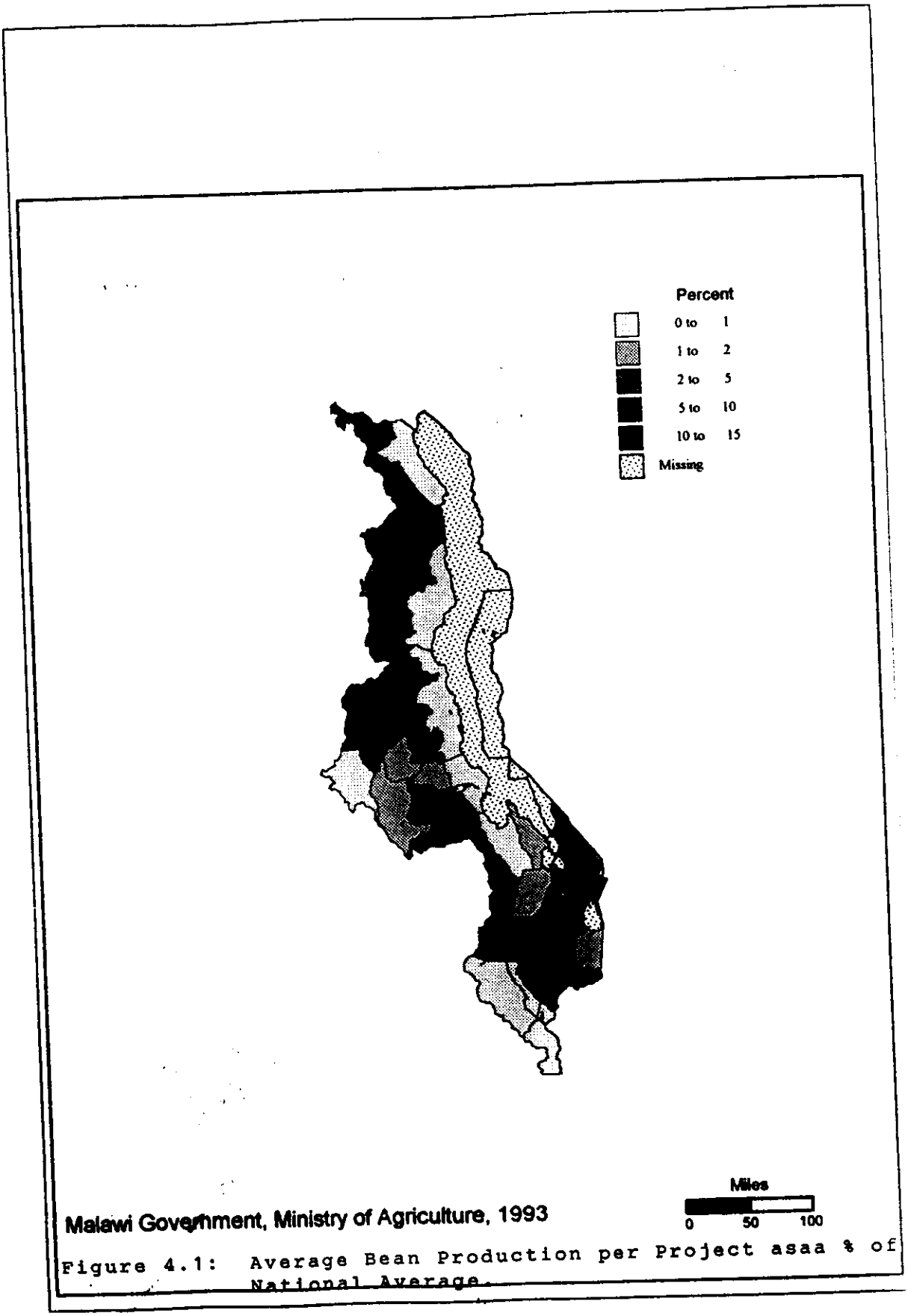

Figure 4.1: Average Bean Production per Project asaa % of National Average.

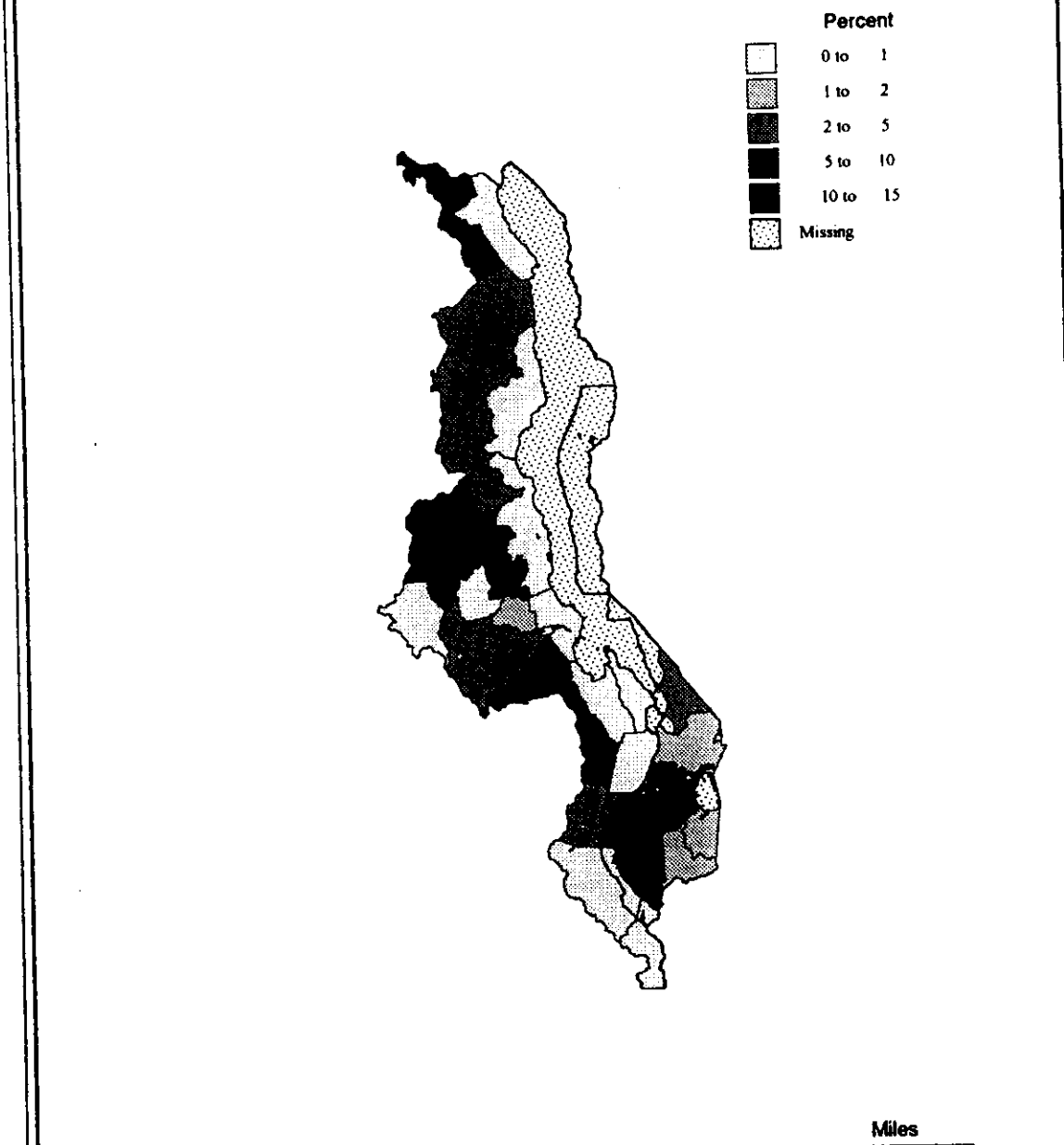

Figure 4.2: Average Bean Hectarage per Project as a % of National Average.

4.3.3 Bean Production Systems

Smallholders in Malawi grow beans as part of the three distinct bean production systems: intercropped with maize (first bean crop), as a relay crop following maize (second bean crop), and as a crop planted during the dry season in *dimbas* (third bean crop). Dimbas are lowlying area which have residual moisture. In dry season, farmers plant crops to utilize the residual moisture. Studies carried out by Ferguson et al. (1991) and Tinsley (1990) show that the importance of each system varies by area, depending on the rainfall patterns and also landholding characteristics described below.

4.3.3.1 First Bean Crop

In this system, beans are planted during the main rainy season, a few weeks *after* maize is planted. Farmers plant beans late as a way to both ration labor and reduce competition between maize and climbing beans. Climbing bean varieties are typically planted near the base of the maize plant, thereby offering structural support to the beans. Bush beans, on the other hand, are planted *between* the maize plants. This early bean crop is planted between October and November, and harvested in March or April.

In Matapwata, farmers regard the first bean crop as a secondary crop. Its main purpose is to provide seed for the second crop, while also serving as a hunger crop before the maize is harvested. Therefore, decisions regarding weeding and fertilizer application are mainly directed at the maize crop.

4.3.3.2 Second Bean Crop

Farmers consider the second crop as their most important source of beans. Generally, yields are higher than for their first bean crop. Planted in several different ways, in land shortage areas like Matapwata in the south, the beans are relay-cropped following maize. Beans are allowed to mature as a pure stand. In Matapwata and much of the Shire Highlands, farmers time their planting to take advantage of the *chiperoni* winds, which bring showers during the cool-dry season and hence extend the otherwise short rainy season. In contrast, in areas where farmers have relatively large landholdings, as in North and South Phoka, beans are planted in pure stands - in gardens which were fallow during the first season. In some areas, like the Ntchisi RDP, relay cropping of beans was not common because of the short rainy season. There, the third bean production system predominated.

4.3.3.3 Third Bean Crop

Farmers typically plant a third bean crop in low-lying areas which retain moisture during the dry season (the *dimbas*.) This bean crop is planted between March and June, and harvested from June to August. The *dimbas* crop is the major crop in areas with little rainfall, as in the Ntchisi and Dedza hills. However, even in areas where beans are relay planted with maize, some farmers also plant beans during the *dimbas*. If climbers are grown, this system is labor-intensive since farmers must provide sticks to support the beans.

4.3.4 Production Activities

The activities associated with bean cultivation are dependent on the cropping system used and the growth characteristics of beans. Where beans are intercropped with maize, weeding and fertilizer application are directed at the maize crop, rather than the beans. However, the bean crop benefits indirectly from the fertilizer and, when intercropped with maize, climbers benefit from the structural support of maize stalks. Apart from labor and land, no other inputs are used in pure stands of beans.

In terms of harvesting, climbing beans and bush beans tend to be harvested differently. Bush beans, when mature, are uprooted and taken to the homestead for further drying. Thereafter, the haulm is threshed and the grain is recovered through winnowing. In contrast, climbers continue to produce pods for several weeks. Thus, dry pods are individually detached from the plant as they mature.

4.4 Bean Price Analysis

4.4.1 Bean Producer and Consumer Prices

As part of Malawi's structural adjustment program, agricultural commodity prices and marketing practices were liberalized to reflect market forces. Although government planners and donors expect this to enhance resource allocation among smallholder farmers, the government *still* exerts an influence over prices by announcing floor prices for producers and ceiling prices for consumers before the next planting season begins.

Farmers generally prefer selling their produce to private traders who usually offer a higher price than ADMARC. Although nominal producer and consumer prices have increased in real terms over the years, producers receive less in the 1990s than in the 1980s (Table 4.7 and Figure 4.3).

These results imply two things. First, the increase in marketing margins could be due to an increase in some services, like storage and transportation although there has been no apparent increase in other services, like processing and packaging. Second, the government taxes both producers and consumers through its marketing board, ADMARC - which, prior to 1991, was the only legitimate buyer and wholesaler of beans (i.e., while producers get less, consumers pay more).

Table 4.7: Real[a] Bean Producer and Consumer Prices, Malawi, 1983 to 1992

Price (t/kg)	Year									
	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Producer	14.68	19.84	[b]	21.06	17.40	13.25	12.49	14.00	14.60	14.05
Consumer	24.23	22.49	[b]	25.06	20.65	[b]	22.42	22.12	24.11	[b]

Source: Malawi Government (1993), *Malawi Agricultural Statistics. Annual Bulletin.* Pages 39 to 42.

[a] The real price was calculated by dividing the Composite Retail Price Index for 1980-1992 into the nominal consumer price and dividing the simple average of the Lilongwe Income and Low Income Price Indexes for 1975-1979 into the nominal producer price.

[b] Data not available.

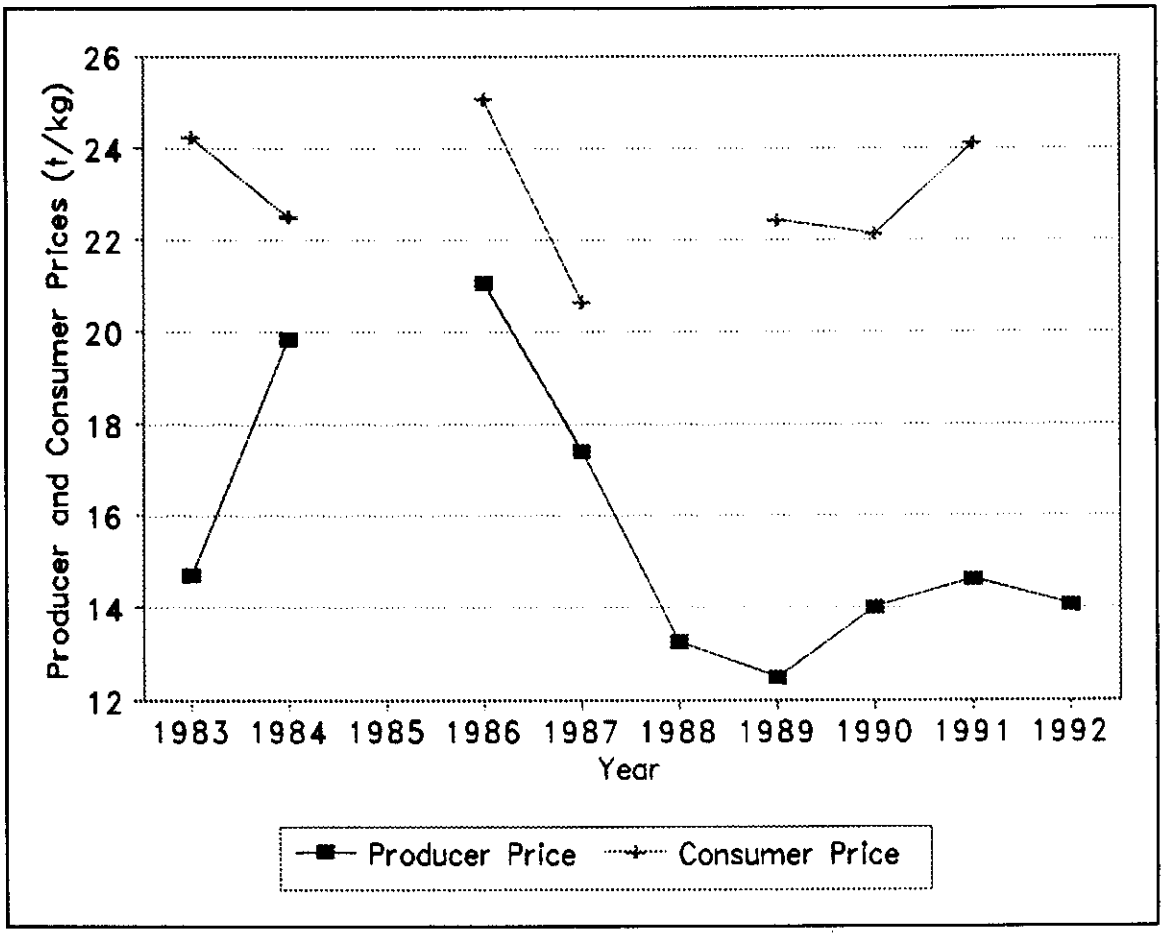

Figure 4.3: Average Producer and Consumer Prices, Malawi 1983 to 1992

Source: Malawi Government, 1993.

4.4.2 Bean Price Seasonality

Monthly bean price data collected in 1992 at three major urban markets, indicate a strong seasonal variation in prices (Table 4.8 and Figure 4.4). A reflection of the production calender, although bean prices were stable in all three markets between January and July, they rose sharply afterwards - signaling this price variation. Since the first crop is harvested in February and March and the second crop in June and July, beans are readily available during the first half of the year because farmers in some parts of the country are harvesting during this period. Also, after June/July, demand shoot up as most people especially in the rural area have cash from their crop sales to afford buying beans. As shown in Figure 4.4, the trend toward higher prices in the latter months of 1992 may have been exaggerated by the severe drought in the sense that supply crippled.

4.4.3 Inter-Regional Prices

In recent years (1988-92), Blantyre City has had the lowest bean prices and Lilongwe City the highest bean prices among the country's three urban areas (Blantyre, Lilongwe, and Mzuzu) (Table 4.9 and Figure 4.5). Although all three urban areas are surrounded by major bean growing districts[25], their differences in price may reflect differences in transport costs. For example, some areas in the Central Region, like Lizulu, supply beans to Blantyre City (a southern city more than 200 km away). Hence, this could be responsible for the change in prices

---

[24] Chitipa and Phoka are near Mzuzu City; Ntchisi and Dedza/Ntcheu Hills are near Lilongwe City; Mulanje/Thyolo are near Blantyre City.

While bean prices were lowest in Blantyre from 1988 to 1991, Lilongwe had the lowest prices in 1992. Blantyre and Mzuzu had almost the same price in this same year.

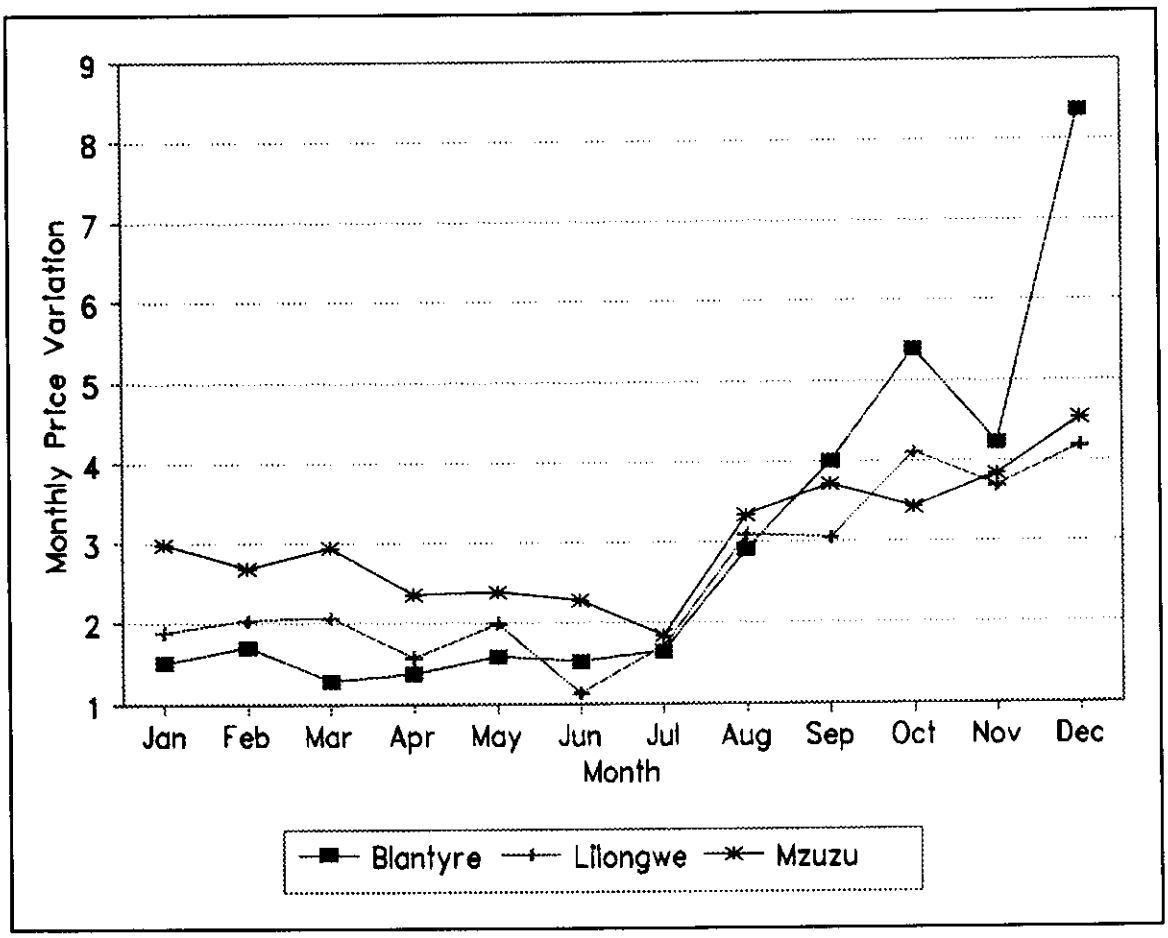

Figure 4.4 Monthly Average Bean Price Variation at Blantyre, Lilongwe and Mzuzu Markets (Malawi, 1992)

Source: Malawi Government, 1993.

Table 4.8: 1992 Monthly Prices[a] in Blantyre, Lilongwe and Mzuzu, Malawi, 1992

Market	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Blantyre	1.50	1.70	1.28	1.37	1.58	1.52	1.65	2.92	4.00	5.40	4.23	8.35
Lilongwe	1.88	2.03	2.07	1.56	1.99	1.13	1.70	3.09	3.05	4.11	3.69	4.18
Mzuzu	2.99	2.68	2.95	2.35	2.38	8	1.84	3.33	3.72	3.43	3.84	4.53

Source: Malawi Government, 1993, *Malawi Agricultural Statistics. Annual Bulletin*. Page 46.

[a] Prices are in MK/kg

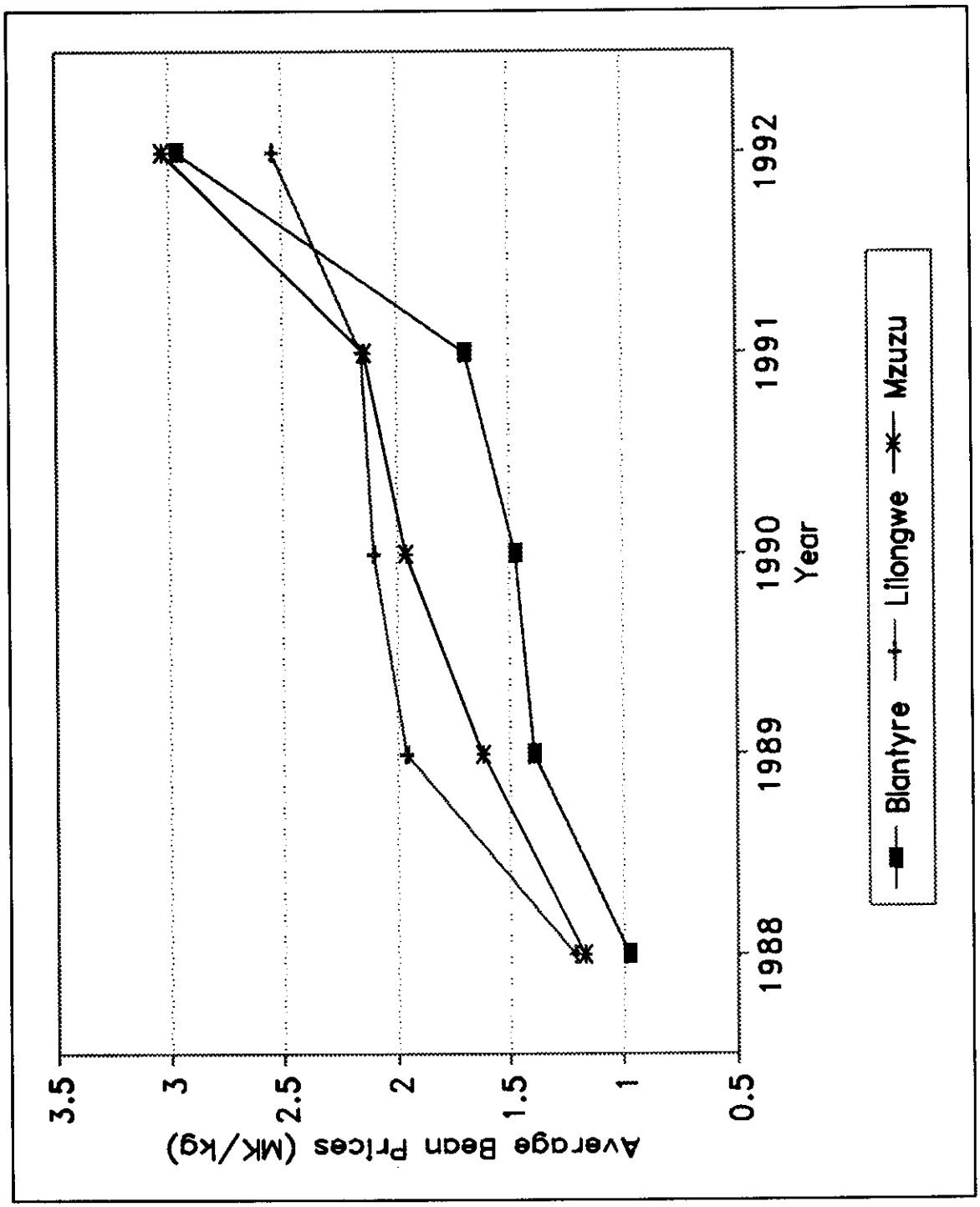

Figure 4.5: Average Annual Bean Prices at Blantyre, Lilongwe and Mzuzu Markets, Malawi, 1988 to 1992

Source: Malawi Government, 1993.

(Table 4.9 and Figure 4.5). The higher bean price in Blantyre may indicate increased transport costs.

Table 4.9: Average Bean Prices[a] in Blantyre, Lilongwe and Mzuzu, Malawi, 1988-1992

Market	Year				
	1988	1989	1990	1991	1992
Blantyre	0.97	1.39	1.47	1.69	2.96
Lilongwe	1.21	1.96	2.1	2.15	2.54
Mzuzu	1.17	1.62	1.96	2.14	3.03

Source: Malawi Government, 1993, *Malawi Agricultural Statistics. 1993 Annual Bulletin*. Page 46.

[a] Price (MK/kg)

4.5 Bean Marketing Channels

In Malawi, most bean consumers rely on the market for a portion of the beans they consume. As stated earlier, beans are not grown in all areas of the country and not all farmers are self-sufficient in beans. Thus, beans must be transported from the main producing areas to consumers - in urban and rural areas - through both formal and informal channels. The main participants in the bean marketing system are: farmers (i.e., producers), local assemblers (who are usually itinerant traders), middlemen, food processors, ADMARC, retailers, NGOs, institutions (i.e., schools and hospitals), and consumers (Figure 4.6).

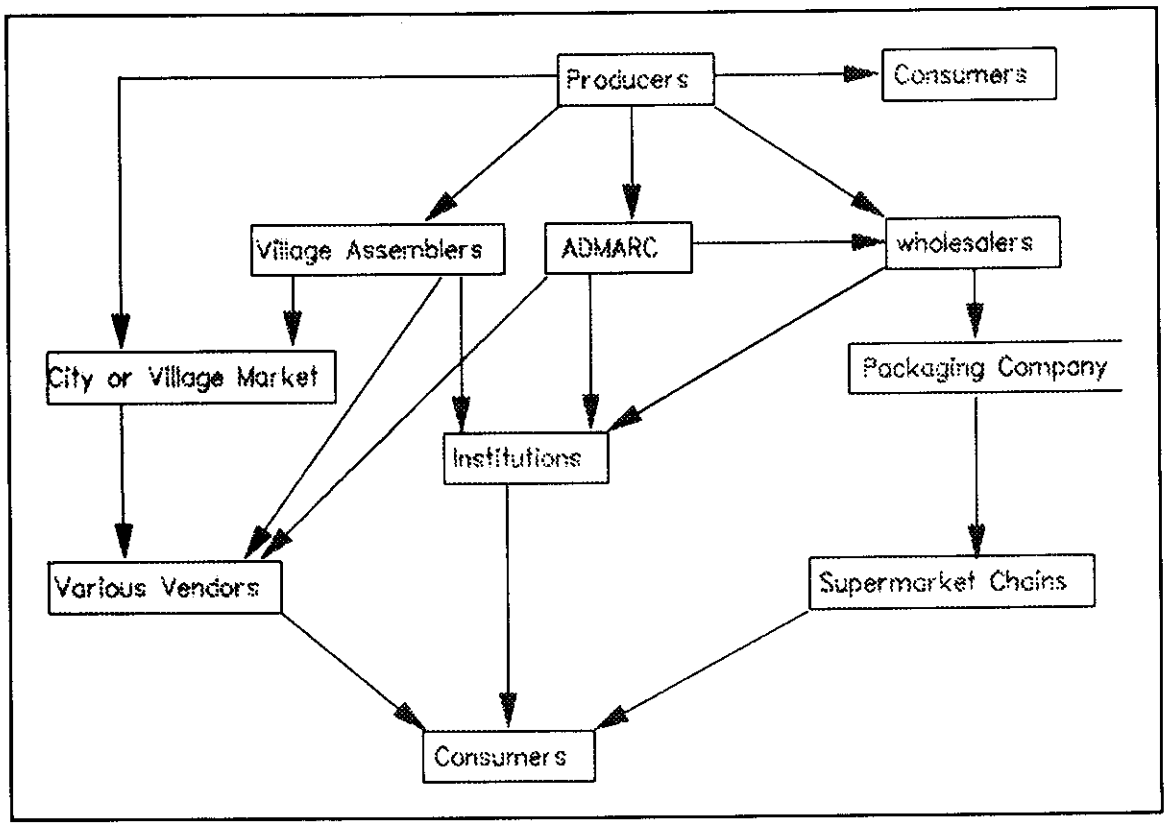

Figure 4.6: Bean Distribution Channels in Malawi

4.5.1 Formal Bean Marketing Channels

4.5.1.1 Bean Buyers

The parastatal, ADMARC, has a mandate to buy beans from farmers at a guaranteed minimum price. The main advantage of ADMARC, compared to private traders, is its nation-wide distribution and purchasing network, enabling it to buy from bean-producing areas, selling in areas where beans are in short supply. During its marketing season, ADMARC buys beans from farmers, using a scale with which to weigh the beans. Through various collection points, beans are shipped to ADMARC's main depots - where they are fumigated to prevent bruchid damage. This is the only form of processing performed by ADMARC. No sorting or grading is done at the depots. Throughout the year, stocks are sold in 50 kg bags to private retailers, bean packers, and institutions (i.e., schools, hospitals and restaurants).

4.5.1.2 Bean Processors and Packers

On the retail side, Tambala Food Products, a subsidiary of Press Corporation Limited, buys beans from both ADMARC and private traders, packaging beans in 500 g and 1 kg bags for two companies. The People's Trading Center (PTC) sells Tambala Beans, while Kandodo sells Kabula Beans. Although both brands are available to consumers, there is no difference between them; both are either *Nanyati* or *Chimbamba* varieties. Thus, the brand names only indicate which company sells the beans.

4.5.2 Informal Marketing Channel

4.5.2.1 Primary Markets

After harvest, farmers can sell their beans in three ways. Most sell their beans at local markets. While some markets are open on a daily basis, most rural markets in rural areas operate only once or twice per week. As discussed above, some farmers also sell beans to ADMARC and, in some cases, private traders directly buy beans from the farmers' homesteads.

Although no studies have been conducted to determine the extent to which middlemen are involved in bean marketing, interviews carried out in 1994 (with 20 retailers in Blantyre, Limbe and Lilongwe) indicate that most market retailers served as their own middlemen. They either visit the markets where producers sell their beans or they buy beans directly from farmers at their homesteads, in turn reselling the beans at urban markets. In contrast to ADMARC, which purchases beans by weight, small private traders use small plates for measuring - irrespective of the amount sold.

4.5.2.2 Retail (Consumer) Markets

In smaller urban areas (where the population is less than 10,000), retail market facilities are modest - often simply open areas in which sellers set up stalls. Contrastingly, in major urban areas, beans are sold to consumers in a large, well-established public retail markets.

In these markets, as stated before, beans are sold to consumers using a plate measure. Three different tin or plastic plate sizes are used. All have been used for a long period of time and are the same plates as those used at primary/wholesale markets. However, as inflation has caused prices to increase, bean sellers have adopted one of two strategies. At Lilongwe market, traders now use cups whose bottoms have been crushed in, and heap beans when making a sale. Bean-sellers at the Blantyre Market use intact cups but no longer heap the plates full. Thus, although the same unit of measure is used in both markets, the amount of beans per cup and respective prices have changed, over time, to reflect inflationary pressures. In either case, it is

common, when making a transaction for the retail seller to add a handful of beans as an incentive to the buyer to return to the seller for future purchases.

Most retailers do not store large stocks of beans. Informal interviews at Lilongwe and Blantyre revealed that most traders keep only one bag of beans, restocking their supply every week or two. While increasing operating costs by requiring retailers to restock every week or two, this practice of maintaining low stocks allows them to tie up only a minimum amount of capital, at any one time, in inventories. This suggests that traders have a cash constraint.

City market sellers pay a nominal daily fee to the market authority (i.e., district council, town council, municipal council, or city council). There is no barrier to entry to these markets as long as the trader can secure a selling spot. It is easier to enter the Blantyre market since, apart from meat, fruit and fish vendors, traders can sell anywhere in the market. At the Lilongwe Market, because a specific area has been set aside for bean vendors, a newcomer will have greater difficulty finding an available selling place. Most vendors also sell other commodities - typically rice, cowpeas and groundnuts. Also, most offer two or more varieties of beans - most commonly *Chimbamba*, *Kayera* or *Nanyati*.

At the time of the interviews, all bean sellers at the Lilongwe and Blantyre Produce Markets and at the Lizulu Market (a primary market) were women. Some respondents in Lizulu suggested that few men sell beans because they are less profitable than other commodities. In contrast, men tend to sell more lucrative commodities - like vegetables, especially tomatoes - which are also more perishable.

In addition to these markets, some individuals sell beans from their houses, either by displaying them on tables near the roadside or by selling them directly to neighbors. Also, Itinerant traders move about the neighborhoods selling beans to consumers. Although the market authorities have tried to discourage this practice (by confiscating the beans), the transaction costs of enforcement are so high that enforcement is rare.

Summary

In Malawi, beans are mainly grown in the mid to upper altitudes. Three distinct production systems are used in Malawi - inter-cropping with maize, relay-cropping with maize or monocropping later after the rains. These systems vary by season, bean growth characteristics and land availability. The third cropping method takes place in the *dimbas*. Areas in which land shortages occur tend to intercrop or relay crop with maize while areas with relatively large landholdings tend to monocrop the second season beans.

Beans are used in various ways ranging from eating bean leaves, green beans, dry beans or other forms. By far the most common way beans are consumed is by cooking dry beans. While varieties like *Chimbamba, Nanyati and Kayera* are found in most parts of the country, some are region-specific. For instance, *Kaulesi* is common in the south and *Nyauzembe* in the north. Neither was reported in the other regions. Although bean production has increased, most of this increase is due to increased hectarage rather than improved yields.

Despite selling beans through various channels, ADMARC maintains its role as a major participant. However, market liberalization has reduced ADMARC's influence by allowing the participation of private traders. Apart from fumigation, ADMARC undertakes no other bean processing activities. Only one company packages beans on behalf of the country's two main supermarket chains.

Bean consumer prices have increased while the producer prices have decreased. This reflects ADMARC's influence on bean marketing since both the consumer and producer prices were set by ADMARC. Also, the data suggest seasonal price variation for beans, with prices remaining stable for much of the first half of the year, while increasing around August.

CHAPTER FIVE
BEAN IMPROVEMENT RESEARCH

The Ministry of Agriculture's National Bean Improvement Program was established in 1969. Its goal has been to: a) breed varieties that are high-yielding, disease-resistant, insect and pest tolerant, and acceptable to consumers, and b) conduct agronomic trials to develop improved cultural practices. Until 1994, this program was headquartered at the Bunda College of Agriculture, a constituent college of the University of Malawi. However, responsibility for this program was handed over to the Ministry of Agriculture's Chitedze Research Station in 1994. Bunda College continues to carry out bean research in collaboration with Bean/Cowpea CRSP.

Initially, the National Bean Program gave priority to collecting local bean types from all over the country, in order to develop a national bean germplasm bank. From this collection, six accessions were released as recommended varieties to farmers in 1979. In 1982, Michigan State University joined Bunda College under the Bean/Cowpea CRSP Project. During the first decade of this collaboration, research activities focused on: studying the biological and social factors which explain the phenotypic diversity of beans found on Malawian farms, and developing a plant improvement strategy to maintain the beneficial effects of this diversity.

In recent years, other organizations joined to support this research, including the Southern African Development Cooperation (SADC), the Centro Internacional de Agricula Tropical (CIAT), GIARA (from Israel), and the Southern African Regional Bean Evaluation and Improvement Nursery (SARBEIN). These organizations have assisted the national program in various ways, supporting both biological and social

science components. Figure 5.1 shows the proposed breeding program currently followed by the National Bean Program.

5.1 Biological Components

5.1.1 Bean Breeding and Agronomic Trials

From the beginning, the Bean/Cowpea CRSP has assisted Malawian scientists in conducting bean variety trials designed to test promising local lines or crosses at various sites throughout the country (Figure 5.1). In recent years, its emphasis has shifted to screening hybrid crosses for not only high yields, but also drought resistance, heat tolerance, disease resistance, and pest resistance/tolerance. While the Bean/Cowpea CRSP has broadly supported the program's core research agenda, GIARA and SARBEIN have focused on drought resistance, mostly by providing germplasm to the National Bean Program for testing. The Bean/Cowpea CRSP has characterized the National Bean Germplasm Collection, making this database available to other countries in the region.

The breeding program uses materials obtained from the National Bean Germplasm Collections, introductions from SARBEIN and CIAT, and cultivars obtained from previous parent-crosses and hybrids. In the first stage, during the varietal development process, crosses are made and observed "on-station" to obtain data on days to maturity, pod set, and grain type. Promising materials are subsequently observed "on-station" for diseases, plant growth stability, drought tolerance, soil fertility, and farmer

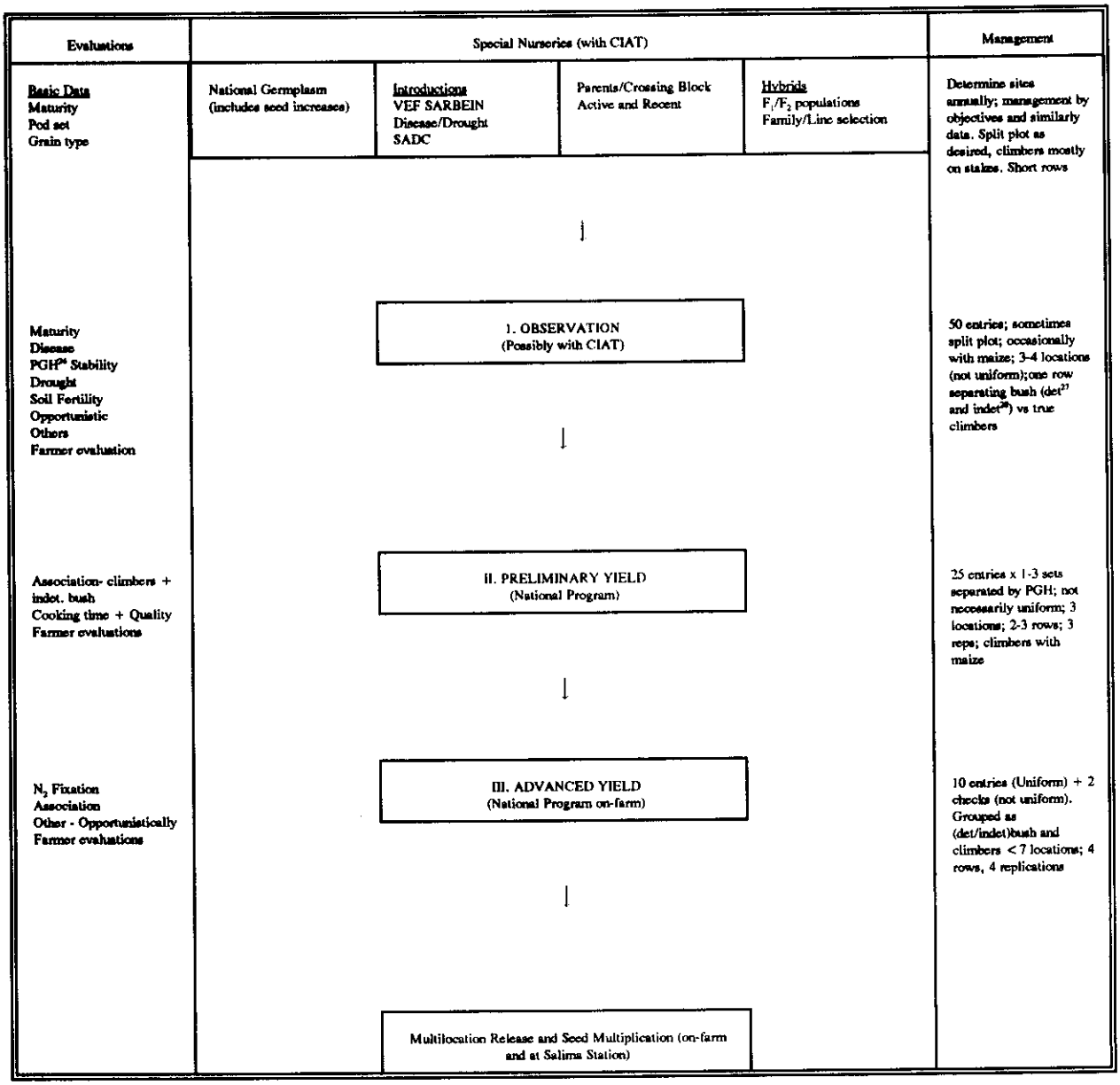

Figure 5.1: Proposal For A Simplified Malawian Bean Breeding Program
Source: National Bean Program (1993)

---

[26] Plant growth habit (PGH).

[27] Determinate.

[28] Indeterminate.

During the second stage, the National Bean Program conducts "preliminary yield trials". The material is assessed with regard to its performance in association with other crops, cooking time and quality, leaf and pod quality, and farmer preferences. During the third "advanced yield" stage, on-farm trials are conducted at various research sites. Materials are evaluated by scientists for their nitrogen-fixing ability and performance when grown in association with other crops, and by farmers to determine their preferences.

After successful completion of these stages, a variety is recommended for release to the Ministry of Agriculture. Once approved, seeds are multiplied by the Bean/Cowpea CRSP and made available to various seed multiplication schemes (These schemes will be discussed in the social science section).

In 1993, the National Bean Program released three improved varieties: *Bunda93*, a local accession collected by CRSP; *Chimbamba*, a hybrid developed by CRSP; and *Kalima*, an introduction from Colombia.

5.1.2 Bean Diseases

The program has so far focused on six bean diseases: bean common mosaic virus (BCMV), Anthracnose, halo blight, common blight bacteria, angular leafspot, and bean rust. The objective of the program is to identify and breed bean lines which are both high-yielding and resistant (or at least tolerant) to these diseases. Local as well as exotic varieties are used in the improvement program.

In 1988, the CRSP U.S. Principal Investigator at Michigan State University stepped down and the U.S. biological sciences portion of the project was transferred to the University California at Davis in 1989. Through this collaboration with the University of California, scientists have discovered that beans from the Mesoamerican gene pool are resistant to some of the major diseases found in Malawi. Since most beans in Malawi are of Andean origin, and susceptible to these diseases, the program is in the process of transferring Mesoamerican disease resistance to the Andean gene pool.

5.1.3 Bean Insect Pests

Previous research identified leaf beetles, aphids, and beanflies as the most detrimental insect pests to bean production (Kantiki, 1989). At one time, when the National Bean Improvement Program had an entomologist, who conducted variety trials as a means for identifying which bean types were tolerant or resistant to these insect pests. However, in recent years, due to a lack of personnel, little further research has been conducted.

5.1.4 Soil Fertility

Research on soil fertility has covered a range of issues, including the effect of maize and bean intercropping on nitrogen and sulphur uptake. Due to low inorganic fertilizer use among smallholders, a few trials have examined the extent to which beans fix nitrogen in the soil. Trials have also been conducted to identify suitable strains of

Rhizobium bacteria, by screening both local and exotic strains of *Rhizobia*, obtained from CIAT.

5.2 Social Science Component

5.2.1 On-Farm Genetic Diversity Maintenance

The role of the social sciences in the National Bean Program has slowly evolved during the past ten years. At the beginning of the Bean/Cowpea CRSP Project, social science research focused on understanding how households maintain bean genetic diversity. These studies led to social scientists recommending that breeders adopt a component breeding strategy. Thus instead of following the traditional breeding strategies, whereby monoculture is encouraged, breeders were advised to develop varieties that farmers could mix with existing seed stock. The justification for this strategy is that farmers who deliberately plant several bean varieties are able to maintain genetic diversity, therefore ensuring yield stability (Ferguson 1987).

5.2.2 Bean Use and Production Systems

In the early 1990s, social science research shifted away from genetic diversity maintenance strategies to household bean use and smallholder production systems. Farmer surveys were conducted in three major bean-producing areas (in the country's three regions) to document marketing and consumption patterns, production patterns and constraints to production (Ferguson et al. 1991). The insights gained from this research led to further research propositions for improving bean productivity.

The key constraints identified, and now being addressed by biological scientists, include the importance of bean diseases and drought. Socioeconomically, the survey identified lack of extension support, poor access to credit, lack of seeds and insufficient seed varieties as major production constraints in the bean subsector.

Since 1986, the Ministry of Agriculture - in collaboration with the National Bean Improvement Program - has run the Smallholder Seed Multiplication Scheme. This program's aim is to multiply bean and other legume seeds (like groundnuts and soybeans) to meet the seed needs of smallholder farmers. The National Bean Program has also been collaborating with NGOs, like ActionAid-Malawi and the Christian Service Committee of Malawi, to address seed shortage problems among smallholders - this time through their respective smallholder seed multiplication schemes. To better understand the strengths and weaknesses of this work by the Ministry of Agriculture, the Bean/Cowpea CRSP has, since 1994, been carrying out a pilot study of these schemes. Its emphasis has been to identify the institutional structures which will facilitate more efficient seed multiplication and distribution (see Section 5.2.4).

5.2.3 New Bean Variety Impact Studies

Although the first set of recommended varieties were released as far back as 1979 (landraces in 1979 and hybrids in 1994), no studies were conducted to determine their farm-level impact. In 1995, the Bean/Cowpea CRSP initiated a study to assess the impact of a new variety, *Kalima* released in 1993. Through this study, smallholder farmers were asked to plant *Kalima* and compare it with their traditional varieties.